

PICK  
EVERARD



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## Fire Safety Strategy Report Stage 3

Required at: Surrey Outdoor Learning and Development Centre, Thames Young Mariners, Riverside Drive, Richmond, London, TW10 7RX

Prepared on behalf of: Pick Everard

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## 1 EXECUTIVE SUMMARY

Osborn Associates have been commissioned by Pick Everard to provide fire safety consultancy for the new mixed-use Thames Young Mariners development in Richmond, London. This report documents the fire strategy for the development using the current regulations in order to provide information on safety concerns and recommendations on how to achieve better fire safety for current standards.

This RIBA Stage 3 Fire Safety Strategy has largely been developed based on the guidance of Approved Document B Volume 2 2019 editions incorporating 2020 amendments (ADB Vol 2), which will be followed for the design of the non-residential and short-stay residential areas of the Main Building, the short-stay Guest Residential Buildings and the Camping Changing Building.

The guidance of Approved Document B Volume 1 2019 editions incorporating 2020 amendments (ADB Vol 1) will be used for the design of the residential apartment provided at the first floor level within the Main Building.

Both will also consider the June 2022 amendments to Approved Document B, Volume 1 and Volume 2 that come into effect on 1 December 2022 to future-proof the development.

Where departures from the prescriptive design basis exist, other fire engineering principles are employed to support alternative solutions in the fire safety design and the proposals are documented.

Simultaneous evacuation strategy will generally be employed within all buildings, where the entire building is evacuated immediately on receiving an evacuation signal or instruction. Each building will evacuate independently from the other, however.

An exception is that within the Main Building the residential long-stay area will evacuate independently from the rest of the building.

The Main Building will be provided with an L2 standard automatic fire detection and alarm system in line with BS 5839-1 that will be provided within the building to support the provision of overnight bedroom. An LD2 standard automatic fire detection and alarm system in line with BS 5839-6 will be provided within the residential apartment.

The Guest Residential buildings will be provided with an L2 standard automatic fire detection and alarm system in line with BS 5839-1.

Camping Changing building will be provided with a manual fire alarm system.

No sprinkler protection will be provided within any of the buildings.

This strategy report has not been developed to address property protection. However, the features that are included for life safety will contribute to some extent to business and property protection. Apart from where noted in this report, the designs will be in accordance with the recommendations of Approved Document B Volume 1 and 2 and the documents referenced therein.

All aspects of the fire safety design will be subject to review and approval by the Building Control Body and the London Fire Brigade to which this report and all subsequent versions and relevant design matters, are considered, assessed, and controlled through a Works Authorisation Process.

## 2 LEGISLATION APPLICABLE

This Fire Strategy Report outlines the proposed fire safety strategy for the new mixed-use development in Richmond, London. The purpose of this report is to set out and detail the fire safety principles that would be present in the building if it was to be constructed at the time of this report.

### 2.1 RELEVANT LEGISLATION

The building and safety measures described in this fire strategy will need to satisfy the relevant provisions of the following fire related legislation:

- The Building Regulations 2010 as amended 2018.
- Regulatory Reform (Fire Safety) Order 2005.

### 2.2 BUILDING REGULATIONS 2010

The Building Regulations, produced under the Building Act 1984, are the primary legislation controlling building work and applies to the majority of new or materially altered buildings.

Part B of Schedule 1 to the Building Regulations includes five functional requirements.

- Regulation B.1 Means of Warning and Escape.
- Regulation B.2 Internal Fire Spread (Linings).
- Regulation B.3 Internal Fire Spread (Structure).
- Regulation B.4 External Fire Spread.
- Regulation B.5 Access and Facilities for the Fire Service.

This fire strategy, along with plans issued by the architect, is intended to demonstrate full compliance with the above regulations.

### 2.3 REGULATORY REFORM (FIRE SAFETY) ORDER 2005

The Fire Safety Order is the primary piece of legislation relating to fire safety in occupied, non-domestic premises (but including the common areas of apartment blocks) and is usually enforced by the local fire authority.

The duty of ensuring that the requirements of the Order are met rests with the Responsible Person, who must undertake a risk assessment for the purpose of identifying the fire precautions he needs to take.

### 2.4 STATUTORY CONSULTATION

During the Building Regulations application process, the building control body is required to formally consult with the local fire authority. The purpose of this consultation is to give to the fire authority the opportunity to make observations with respect to the Building Regulations and to provide an opportunity to make the applicant aware of action that may have to be taken to meet the requirements of the Fire Safety Order.

The consultation should allow both parties to reach mutually compatible views on whether the building meets the requirements of both pieces of legislation. In the exceptional event that the fire authority requires physical changes to be made to the building to meet the requirements of the Fire Safety Order, the building control body should make the applicant aware.

## 2.5 FIRE RISK ASSESSMENT

There is now a requirement for a fire risk assessment to be undertaken for virtually all non-domestic premises. In many instances the significant findings of this assessment are to be recorded. Furthermore, the onus on proving what reasonable fire safety measures should be provided lies with the person responsible for the building, not the enforcing authority.

According to PAS 79 – Fire Risk Assessment – Guidance and a Recommended Methodology – the risk assessment can only validly be carried out when a building is in normal use. However, it should be noted that there is no grace period between occupation and completion of the risk assessment, and thus failure to undertake a risk assessment prior to occupation could constitute a breach of legislation. OAL are therefore of the opinion that a pre-occupation risk assessment is essential to assist the responsible person in fulfilling their legal obligations.

The Building Regulations do not specifically require a risk assessment to be undertaken. However, the development of a fire strategy has risk assessment at its core, thereby ensuring that the measures provided in the building reflect the risk presented by those buildings intended use.

## 2.6 REGULATION 7 – MATERIAL AND WORKMANSHIP

Regulation 7 of the Building Regulations requires that all building work should be carried out in a workmanlike manner, with adequate and proper materials that are appropriate for the circumstances in which they are used, are adequately mixed and prepared, and are applied, used or fixed so as to perform the functions for which they are designed. Further guidance is provided in the Approved Document supporting Regulation 7.

Independent certification schemes exist to provide additional confidence that products are manufactured and installed to an appropriate and consistent standard. It is therefore suggested that, where appropriate, manufacturers and installers that are subject to independent certification schemes are specified on this scheme.

## 2.7 REGULATION 38

Regulation 38 of the Building Regulations requires fire safety information for a new or altered building to be passed to the responsible person at the completion of the project or on occupation, whichever comes sooner.

The aim of this requirement is to provide the responsible person with appropriate information to assist him to operate and maintain the building in reasonable safety.

This information can therefore assist the responsible person in undertaking a risk assessment to meet the requirements of the Fire Safety Order.

As the developer of the fire strategy, Osborn Associates are well-placed to produce the information to meet these requirements. This will ensure a smooth transition between the design stage and the safe occupation of the completed building.

## 3 BUILDING DESCRIPTION

The Surrey Outdoor Learning and Development Centre, Thames Young Mariners, is a new mixed-use development located on Riverside Drive, Richmond, London, TW10 7RX and consisting of the following:

- Main Building – LG+G+1, consisting of non-residential accommodation such as changing rooms and storage area at lower ground, changing areas, kitchen/servery, hall and offices at ground floor, with plant room and two residential areas, one short stay and one long stay, at first floor level.
- 3 x Guest Residential Buildings – G, consisting of dormitory-style residential accommodation with separate bedroom areas and a shared social and learning area, as well as separate plant room.
- Camping Changing Building – G, consisting of changing areas, storage areas, plant rooms and a classroom/social area.

The Main Building is accessed directly from outside at both lower ground and ground floor levels due to the sloping site, with the first floor areas accessed via a protected stair.

The Guest Residential and Camping Changing buildings are accessed directly from external.

The site layout showing the building locations is shown in Figure 1, with building elevations and heights shown in Figure 2, Figure 3 and Figure 4.

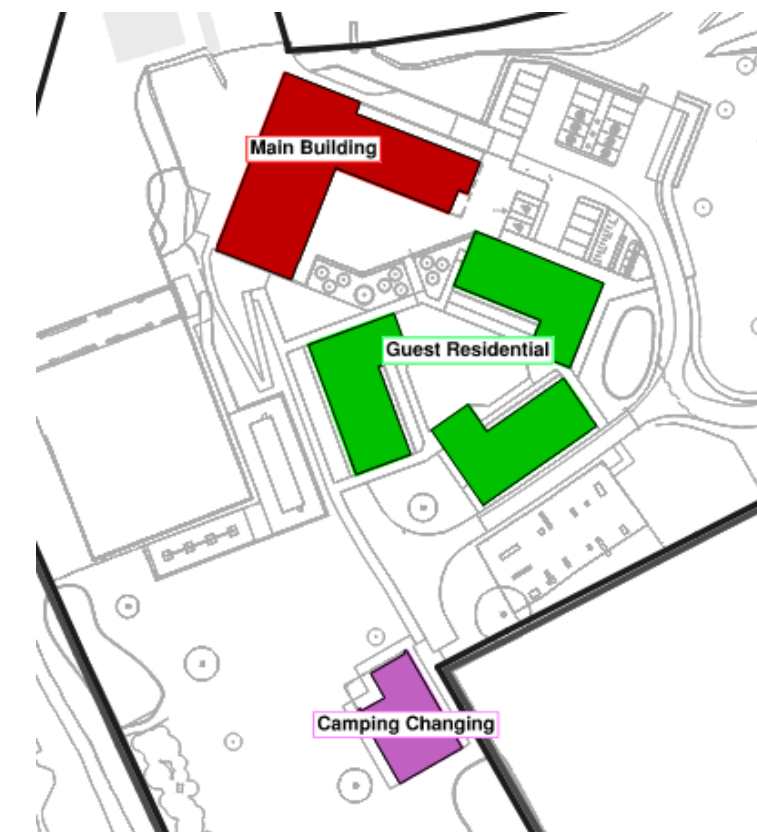


Figure 1 – Site Layout



Figure 2 – Main Building Elevation



Figure 3 – Guest Residential Building Elevation



Figure 4 - Camping Changing Building Elevation

## 4 MEANS OF ESCAPE

### 4.1 MAIN BUILDING

#### 4.1.1 Evacuation Strategy

The Main Building will generally have simultaneous evacuation policy, with all areas evacuating on alarm for detection of smoke or fire anywhere in the building.

A simultaneous evacuation is the selected approach when it is unreasonable to expect the occupants to remain in the building for a prolonged time when there is a fire. This considers not only the physical effects of the fire, but the psychological response of the occupants confronted by an outbreak of fire.

The fire alarm system will signal the evacuation of the building on the activation of a manual call point. No acknowledgement or investigation period is proposed.

However, the residential long-stay area at the first floor level will evacuate independently from the rest of the building and will form its own evacuation zone.

#### 4.1.2 Purpose Group

The purpose groups within the Main Building will be as follows:

- Assembly and recreation, 5 – for lower ground – first floor non-residential areas.
- Residential, 1(a) – for the first floor apartment.
- Residential (other), 2(b) – for first floor staff overnight bedroom.

#### 4.1.3 Means of Escape

##### Travel Distances

The travel distances within the non-residential areas of the building will need to be limited as follows:

- Main building areas – 18m in a single direction and 45m where alternatives are available.
- Within plant rooms – 9m in a single direction and 35m where alternatives are available.
- Overall escape distance from plant rooms – 18m in a single direction and 45m where alternatives are available.
- Open air plant areas – 60m in a single direction and 100m where alternatives are available.

This is currently achieved from all areas of the Main Building, as shown in Figure 5 - Figure 7.

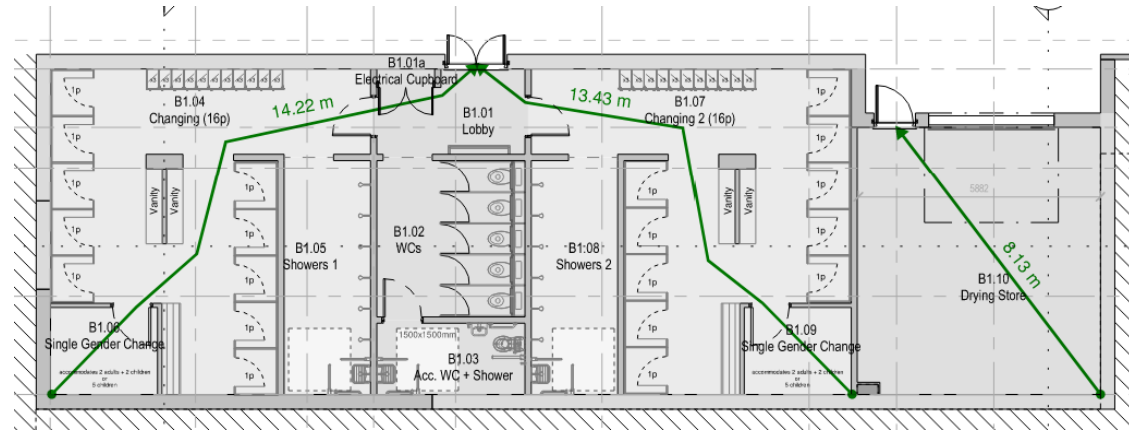


Figure 5 – Main Building Travel Distances – Lower Ground Floor

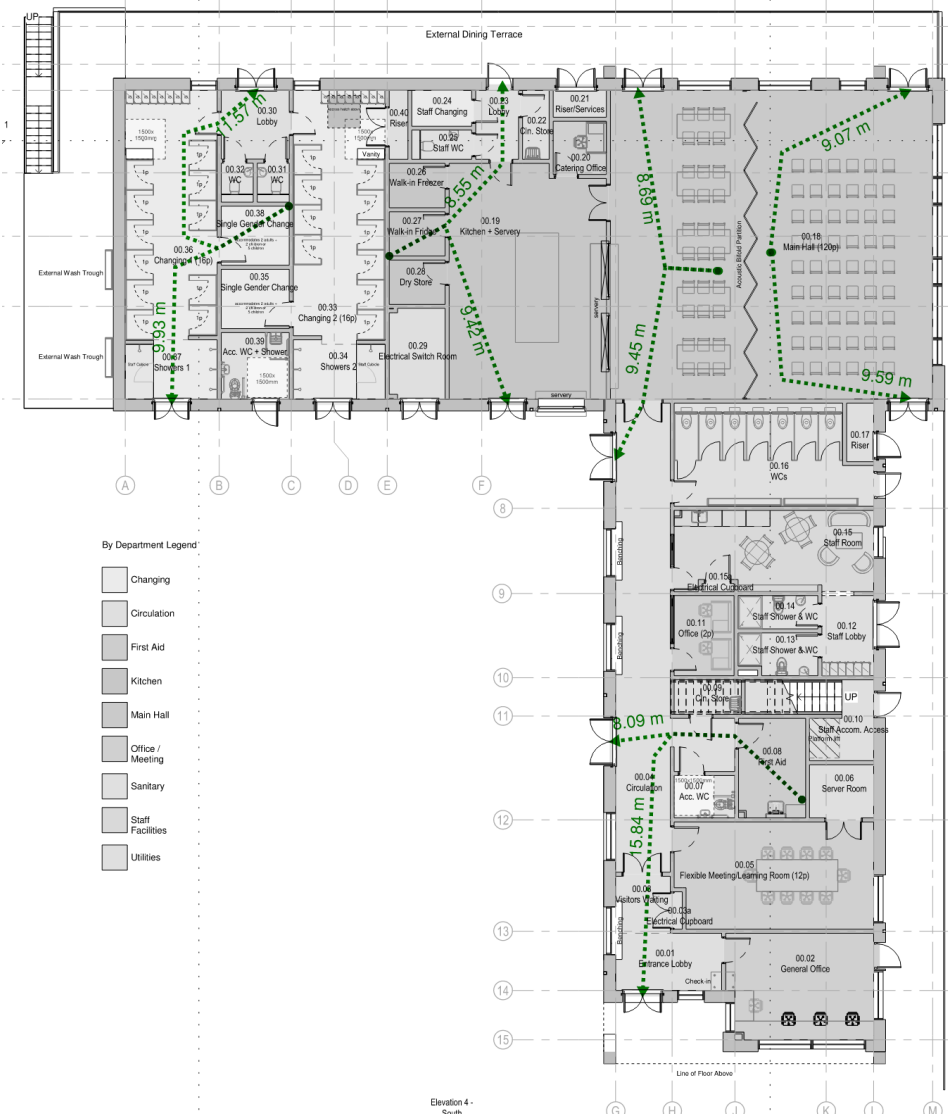


Figure 6 – Main Building Travel Distances – Ground Floor

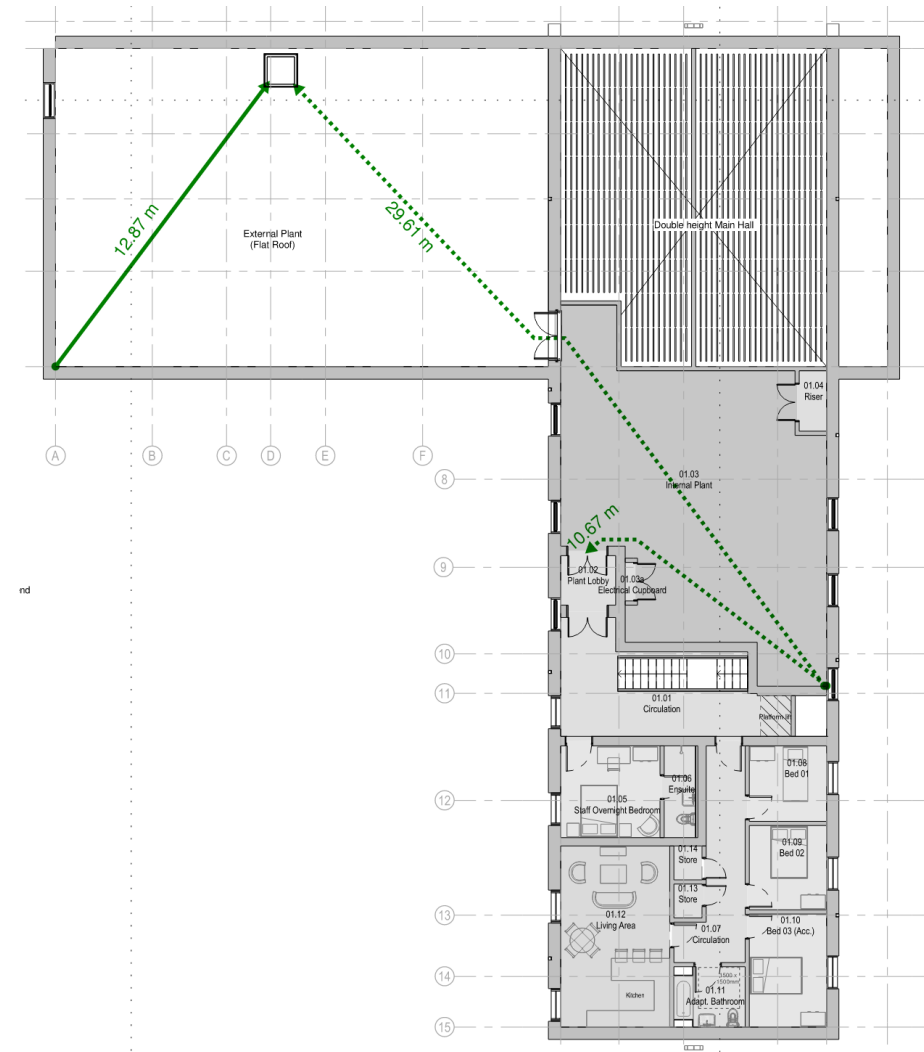


Figure 7 – Main Building Travel Distances – First Floor

It should be ensured that the travel distances within the plant room areas are not exceeded once the plant fit out is known.

**Escape Capacity**

The summary of the escape capacity provided from the non-residential areas of the Main Building is presented in Table 1 below.

The exits highlighted in red are discounted as they are assumed to be affected by the effects of smoke or fire for the purposes of the assessment of the escape capacity, in line with ADB Vol 2 recommendations.

The occupancy of the building areas should not exceed the maximum total escape capacity numbers provided within Table 1.

**Table 1 – Exits Serving the Facilities Building**

Level	Exit	Exit Width, mm	Escape Capacity, Person	Total Escape Capacity
Lower Ground	Changing Areas	1300	60 <sup>1</sup>	<b>60</b>
Lower Ground	Drying Store	850	60 <sup>1</sup>	<b>60</b>
Ground Floor	Changing Areas Lobby	1300	260	<b>480</b>
	Showers 1	1200	240	
	Showers 2	1200	240	
Main Building	Kitchen + Servery 1	850	60 <sup>2</sup>	<b>1730</b>
	Kitchen + Servery 2	1200	240	
	Main Hall 1	1300	260	
	Main Hall 2	1300	260	
	Main Hall 3	1300	260	
	WCs	850	110	
	Staff Lobby	1600	110 <sup>3</sup>	
	General Office	850	110	
	Entrance Lobby	1300	60 <sup>2,4</sup>	
	Circulation 1	1600	320 <sup>4</sup>	
	Circulation 2	1600	320	

Note 1: As each of the two areas is independent and provided with a single exit, the occupancy of each space will need to be limited to 60 occupants.

Note 2: The escape capacity provided by the exit is limited by the doors opening against the direction of escape located on the escape route leading to the final exit.

Note 3: The escape capacity provided by the exit is limited by an 850mm wide door located on the escape route leading to the final exit.

Note 4: The exits could be simultaneously affected by the effects of smoke or fire and as such both exits are discounted for the purposes of the assessment.

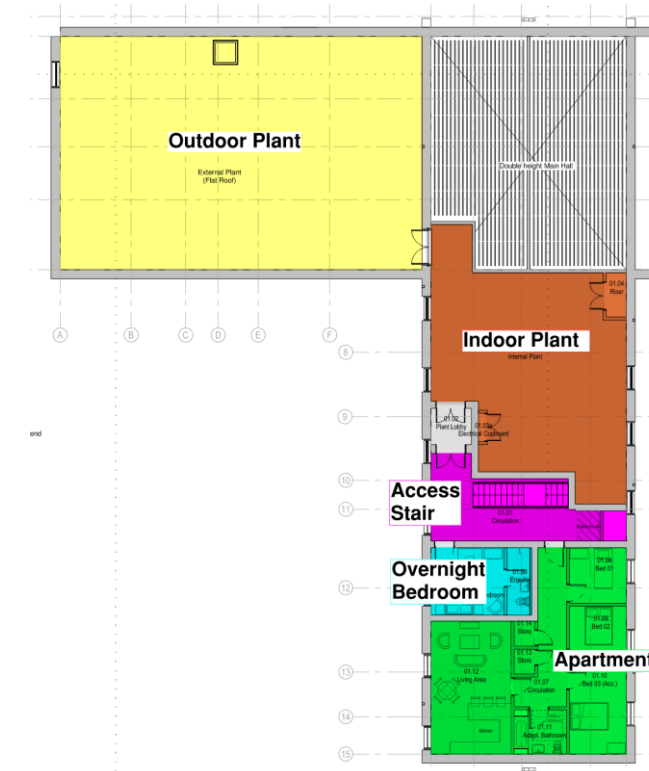
The First Floor contains residential areas and plant, which will only be accessed sporadically for maintenance purposes. It is also accessed via a stair that is independent from the rest of the building. Therefore, escape from these areas is discussed separately in Section 4.1.4.

**4.1.4 First Floor Areas**

The first floor area of the Main Building consist of three types of the accommodation:

- Plant areas, both indoor and outdoor.
- Staff overnight bedroom, i.e., short stay residential accommodation.
- Residential apartment.

These areas, along with the stair used to access these areas are shown in Figure 8. The access stair discharges directly to outside at ground floor level independently from the rest of the building.



**Figure 8 – Main Building First Floor Areas**

The Plant and Overnight Bedroom areas will evacuate simultaneously with the rest of the building.

The residential apartment will evacuate independently from the rest of the building and access to it will be designed in line with the ADB Vol 1 Guidance Recommendations for small single stair residential buildings. As such, the following will be provided to support this:

- The hallway providing access to the rooms within the apartment will be designed as a protected hallway.
- The apartment will be compartmented from the rest of the building.
- The stair serving the apartment will be a protected stair.
- Plant areas and the overnight bedroom will be separated from the protected stair by protected lobbies with at least 0.4m<sup>2</sup> permanent natural smoke venting or an equivalent mechanical smoke venting system.
- An openable vent with a free area of at least 1m<sup>2</sup> will be provided at the head of the stair, operable remotely at the fire and rescue service access level.

This arrangement for the first floor level is illustrated in Figure 9.



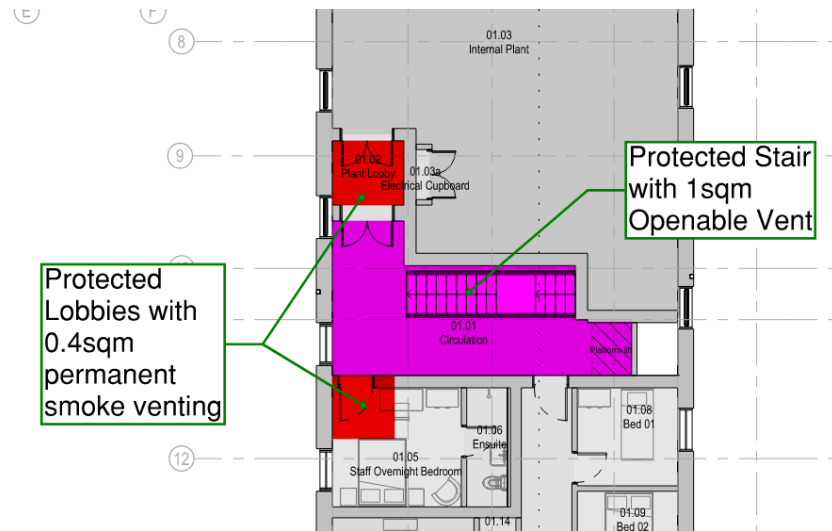


Figure 9 – Main Building First Floor Protected Escape Route Arrangement

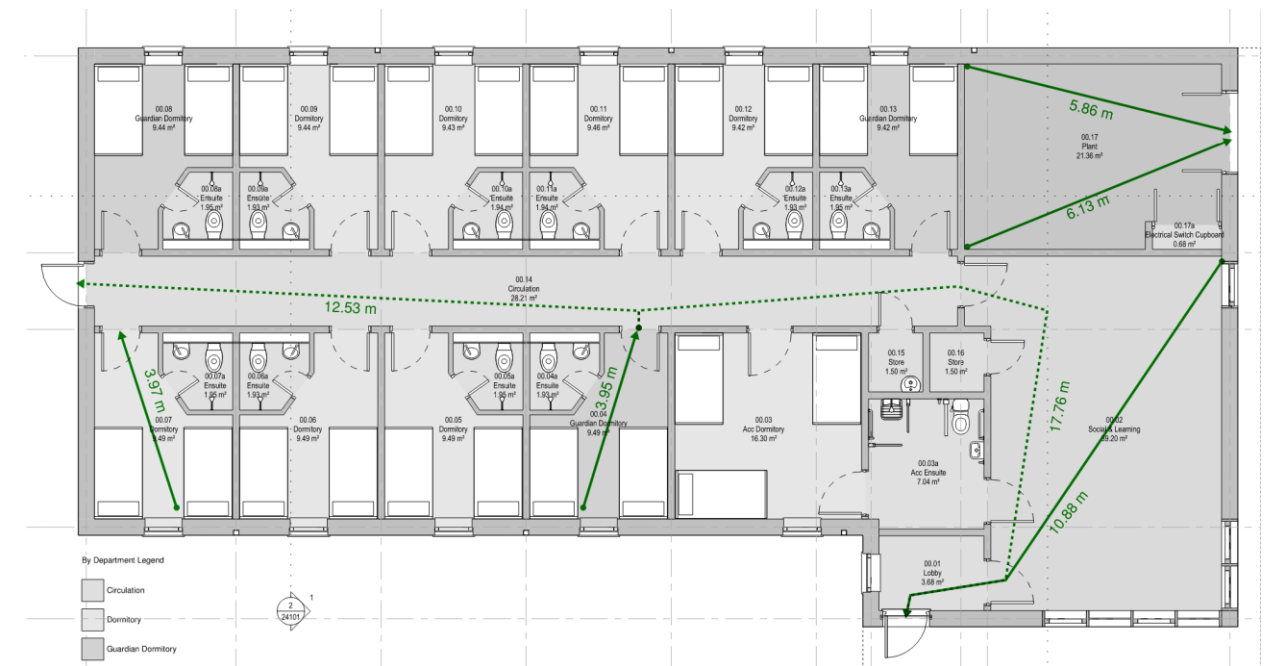


Figure 10 – Guest Residential Building Travel Distances

## 4.2 GUEST RESIDENTIAL BUILDINGS

### 4.2.1 Evacuation Strategy

The Guest Residential buildings will have simultaneous evacuation policy, with all areas evacuating on alarm for detection of smoke or fire anywhere in the building.

A simultaneous evacuation is the selected approach when it is unreasonable to expect the occupants to remain in the building for a prolonged time when there is a fire. This considers not only the physical effects of the fire, but the psychological response of the occupants confronted by an outbreak of fire.

The fire alarm system will signal the evacuation of the building on the activation of a manual call point. No acknowledgement or investigation period is proposed.

Each individual Guest Residential building will evacuate independently from the other buildings, however.

### 4.2.2 Purpose Group

The Guest Residential buildings will be used as short stay dormitory-style accommodation. As such, they will be classified as Residential (other), 2(b) purpose group.

### 4.2.3 Means of Escape

Each Guest Residential building will have a single floor consisting of bedrooms and shared Social and Learning space, as well as independently accessed plant area.

Travel distances within the buildings will need to be limited as follows:

- Within bedrooms – 9m in a single direction and 18m where alternatives are available.
- Within bedroom corridors – 9m in a single direction and 18m where alternatives are available.
- Within plant room – 9m in a single direction and 35m where alternatives are available.
- Elsewhere – 18m in a single direction and 45m where alternatives are available.

This is achieved from all areas of the building, as shown in Figure 10.

As two 850mm wide exits are provided serving the residential areas, each building occupancy will need to be limited to 110 occupants after discounting one of the exits as it could be affected by smoke or fire.

## 4.3 CAMPING CHANGE BUILDING

### 4.3.1 Evacuation Strategy

The Camping Change building will have simultaneous evacuation policy, with all areas evacuating on alarm for detection of smoke or fire anywhere in the building.

A simultaneous evacuation is the selected approach when it is unreasonable to expect the occupants to remain in the building for a prolonged time when there is a fire. This considers not only the physical effects of the fire, but the psychological response of the occupants confronted by an outbreak of fire.

The fire alarm system will signal the evacuation of the building on the activation of a manual call point. No acknowledgement or investigation period is proposed.

### 4.3.2 Purpose Group

The Camping Change building will be classified as Assembly and Recreation, 5 purpose group.

### 4.3.3 Means of Escape

The Camping Changing building will have a single floor consisting of toilet areas, plant rooms, storage area and a Classroom/Social area.

Travel distances within the building will need to be limited as follows:

- Within plant room – 9m in a single direction and 35m where alternatives are available.
- Elsewhere – 18m in a single direction and 45m where alternatives are available.
- Open air plant areas – 60m in a single direction and 100m where alternatives are available.

This is achieved within all areas of the building, as shown in Figure 11.

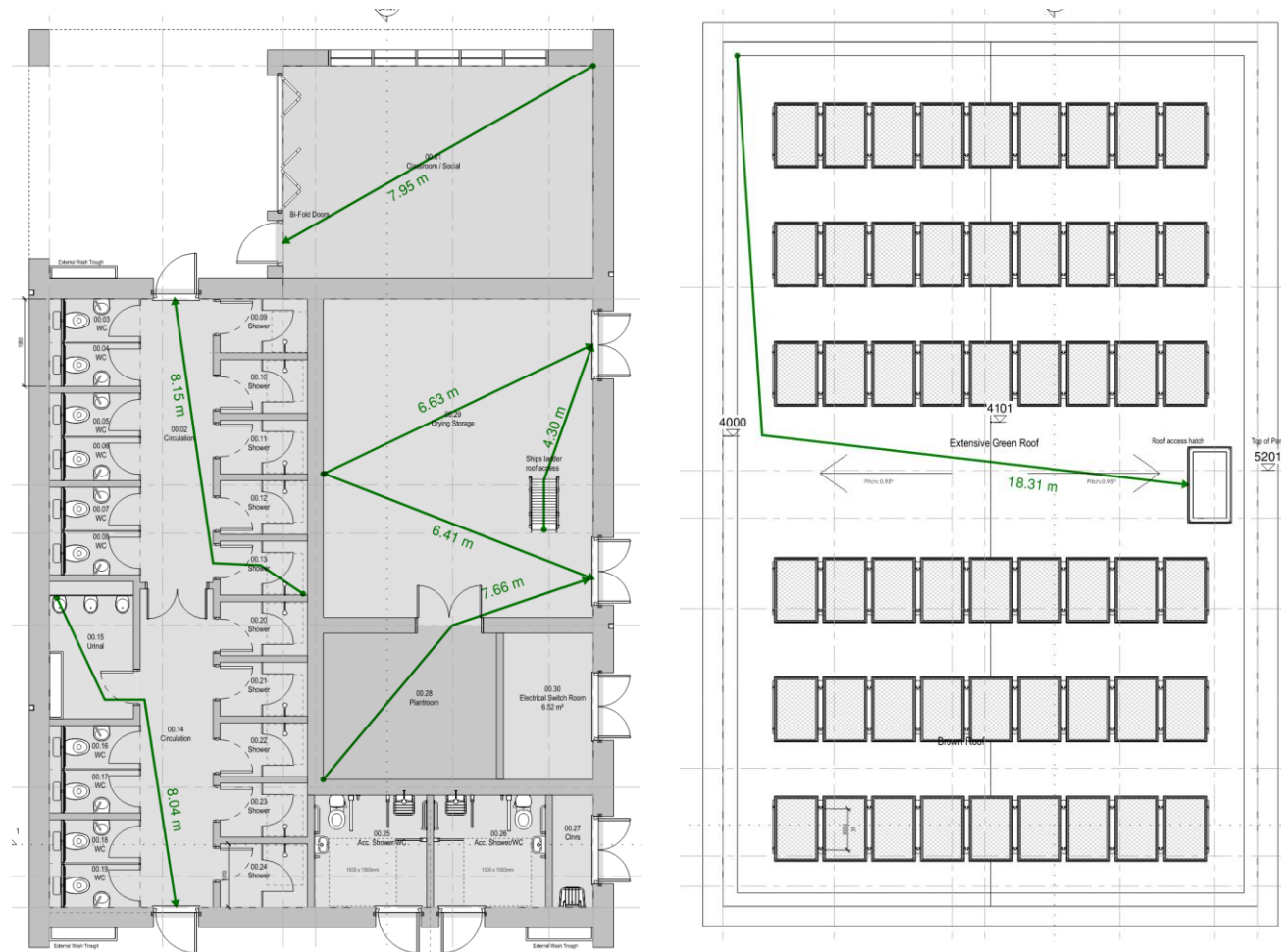


Figure 11 – Camping Changing Building Travel Distances

Two 850mm wide exits are provided from the toilet area, limiting the maximum occupancy to 110 people after discounting an exit.

The drying storage area is provided with two 1300mm exits, but they are located close to each other and could be discounted simultaneously, limiting the maximum area occupancy to 60 occupants.

The Classroom/Social area is provided with a single 850mm wide exit. Therefore, maximum occupancy of this area will be limited to 60 people.

#### 4.4 INNER ROOMS

There are several inner rooms, i.e., rooms where the escape is only possible via another room, within the buildings.

One of the following arrangements will therefore need to be provided to support this:

- The enclosures (walls or partitions) of the inner room stop a minimum of 500mm below the ceiling.

- The door or walls of the inner room contain vision panel (minimum 0.1m<sup>2</sup>), so people can see if a fire starts in the access room.
- The access room is fitted with automatic fire detection and alarm system to warn occupants of the inner room if a fire starts in the access room.

#### 4.5 EVACUATION OF MOBILITY IMPAIRED OCCUPANTS

The occupants at Lower ground level of Main Building and ground floor levels of all buildings will be able to evacuate directly to outside via level escape routes.

Refuges will be provided within the stairs or associated protected lobbies at first floor level within the Main Building.

Each refuge should be a minimum of 900mm x 1400mm in size and accessible by someone in a wheelchair. It should not reduce the width of the escape route or obstruct the flow of people escaping.

Refuges should be provided with an emergency voice communication (EVC) system complying with BS 5839-9. It should consist of Type B outstations communicating with a master station in the building control room (if one exists) or next to the fire detection and alarm panel. In some buildings, wireless technology may be more appropriate.

A Generic Emergency Evacuation Plan (GEEP) would require to be written for building occupants who would need assistance to escape. Further information can be found in BS 8300 and the DCLG Publication “Fire Safety Risk Assessment Supplementary Guide – Means of Escape for Disabled People”.

To comply with London Plan requirements, the lift serving the first floor areas of the Main Building will be designed as evacuation lift to assist with vertical evacuation of mobility impaired occupants. The evacuation lifts will need to be designed in line with the guidance provided within Annex G of BS 9999:2017 guidance.

#### 4.6 FIRE DOORS AND ESCAPE DOORS

All doors used for means of escape on floors would measure a minimum clear width of 850mm if they are required to facilitate wheelchair occupants.

All doors on escape routes would require to either not be provided with a securing device or be provided with a securing device that is easily openable from the inside without the use of a key and without more than one opening mechanism.

Any sliding doors used for escape will be designed to fail open on loss of power or to break open from any position throughout their operating parameters (see BS 7273-4).

Any fire doors fitted with hold-open devices, including cross-corridor doors, would be required to release on:

- 1) Operation of the fire alarm system.
- 2) Manual operation or operation of a hand-operated switch fitted in a suitable position.
- 3) Failure of the electricity supplies.

The clear widths of exit doors would, as a minimum, be required to meet the recommendations of ADB Vol 2. Doors opening onto stairways or corridors would require to be sited so as not to encroach on the required effective width.

All escape routes would maintain a minimum clear height of 2m, and all exit doors will be openable without the use of a key for escape.

Vision panels would be provided in doors that open in both directions and within doors sub-dividing corridors on escape routes.

Fire door assemblies should comply with:

- 1) BS 476-22 or BS EN 1634-2 for fire resistance; and where applicable; and
- 2) BS 476-31 or BS EN 1634-3 for smoke leakage.

#### 4.7 EMERGENCY LIGHTING

Emergency lighting would be required to be installed to provide temporary illumination in the event of failure of the primary power supplies to the normal lighting system. Adequate artificial lighting should be provided in all common escape routes.

Emergency lighting would also be installed in accordance with the recommendations of BS 5266 (parts 1-2 and 4-6). The system would be required to provide emergency lighting for 3 hours in the event of a mains power failure.

Emergency lighting installation would illuminate all internal circulation routes, refuse stores, plant rooms, all final exits from the buildings and firefighting equipment such as the dry rising main outlets where provided.

Primary and emergency lighting would be required for any external escape routes that will not be lit by surrounding street lighting.

Table 2 – Escape Lighting

Purpose Group	Areas Requiring Escape Lighting
Assembly and Recreation	<ol style="list-style-type: none"> <li>1) All internal escape routes.</li> <li>2) All external escape routes.</li> <li>3) Areas directly outside the final exits.</li> <li>4) Toilets with a floor area over 8m<sup>2</sup>.</li> <li>5) Switch gear / battery room for the emergency lighting system.</li> <li>6) Electricity / generator rooms.</li> <li>7) Windowless accommodation.</li> </ol>
Residential (Other)	<ol style="list-style-type: none"> <li>1) All common escape routes (including external escape routes).</li> </ol>
Residential	<ol style="list-style-type: none"> <li>1) All common escape routes (including external escape routes).</li> </ol>

Luminaires would require to be provided, appropriately spaced, to provide the light levels suggested within British Standard BS 5266, see Table 3.

Table 3 – Illuminance for Specific Locations

Location	Response Time (s)	Min Illuminance (lx)	Min Duration (min)	Reference Plane
Defined Escape Routes	5	1	3 hrs	Centre line of the escape route.
Undefined Escape Routes	5	0.5	3 hrs	Floor level excluding border of 0.5m around the perimeter of the room.
Plant Rooms, Switch Rooms and Emergency Winding Facilities for Lifts	5	15	3 hrs	In plane of visual task.
Fire Alarm Control and Indicating Equipment	5	15	3 hrs	In plane of visual task.
Reception Areas	5	15	3 hrs	In plane of visual task.
Security Devices	5	5	3 hrs	Horizontal on plane of panic bar/pad; vertical at vertically mounted/wall mounted security devices.

#### 4.8 FIRE SAFETY SIGNAGE

All signage would meet the recommendations of BS ISO 3864-1, BS 5499-4 and BS EN ISO 7010.

Escape signage would be required to be located as follows, except for escape routes which are in ordinary use:

- 1) All designated escape routes or escape routes across open areas provided with signage, especially stairs and other changes in level and direction.
- 2) The position of all doors and other exits sited on escape routes, including storey exits and final exits will be identified by signs.
- 3) Where an escape route from a room is not conspicuous or confusion could occur, the route will be indicated by a sign, including intermediate signs where necessary.
- 4) All changes of direction in corridors, stairways and open spaces forming part of an escape route will be marked with intermediate signs. Each intermediate door or junction will be similarly signed.

Fire resisting doors in the common areas, excluding the entrance doors to apartments, would be signed with 'Fire Door Keep Shut' and riser doors would be signed with 'Fire Door Keep Locked'.

Firefighting equipment, including the ventilation controls and overrides in and around the building, would be provided with signage.

### 5 ACTIVE FIRE SAFETY SYSTEMS

#### 5.1 AUTOMATIC WATER FIRE SUPPRESSION

No automatic fire suppression will be provided in all of the buildings.

## 5.2 AUTOMATIC FIRE DETECTION AND ALARM

The Main Building will be provided with an L2 standard automatic fire detection and alarm system in line with BS 5839-1 will be provided within the building to support the provision of overnight bedroom. A LD2 standard automatic fire detection and alarm system in line with BS 5839-6 will be provided within the residential apartment.

The Guest Residential buildings will be provided with a L2 standard automatic fire detection and alarm system in line with BS 5839-1.

Camping Changing building will be provided with a manual fire alarm system.

## 6 INTERNAL FIRE SPREAD

### 6.1 INTERNAL LININGS

In the early stages of a fire in a building, the choice of material for the lining of walls and ceilings can significantly affect the spread of fire and its rate of growth. It is particularly important that in circulation spaces, where the rapid spread of fire is most likely to prevent occupants from escaping, the surface linings are restricted by making provision for them to have low rates of heat release and surface spread of flame.

All wall and ceiling linings within the building should meet the recommendations of the table below when tested under either the National Classifications (in accordance with BS 476 part 7:1997) or under the European Classifications (in accordance with BS EN 13501-1:2002).

**Table 4 – Classification of Linings**

Location	European Class
Small room of area not exceeding 4m <sup>2</sup> in residential areas.	D-s3, d2
Small room of area not exceeding 30m <sup>2</sup> in non-residential areas.	
Other rooms (including garages).	C-s3, d2
Circulation spaces.	B-s3, d2

Parts of the wall area in rooms may be of poorer performance than specified above, but not less / worse than Class D-s3, d2.

Internal escape routes should generally have wall and ceiling linings achieving a B-s3, d2 surface spread of flame standard, apart from permitted exceptions which may be noted elsewhere in this report.

These should be maintained for the lifecycle of the building and manufacturer's guidelines should be followed with respect to maintenance and replacement of their products. Display features or items such as posters, artwork pieces, etc may be included with appropriate consideration through risk assessment, justification and on-going control.

Where thermoplastic materials are used (e.g., windows, rooflights and lighting diffusers only), these would comply with the recommendations given in Sections 6.13 – 6.17 of ADB Vol 2.

### 6.2 STRUCTURAL FIRE RESISTANCE

The top floor heights of both buildings above the adjacent ground level of the residential buildings are as follows:

- Main Building – 7.07m.
- Guest Residential Buildings – single-floor building.
- Camping Changing Building – single-floor building.

Therefore, when tested in accordance with either BS 476 suite of standards or the relevant European Standard (BS EN 1364, 1365, or 1366), the elements of structure in the buildings should achieve the following fire resistance for loadbearing capacity (R):

- Main Building – 60 minutes fire resistance.
- Guest Residential Building – 30 minutes fire resistance.
- Camping Changing Building – 60 minutes fire resistance.

There is no requirement to protect structural elements that only provide support to the roof, unless one of the following applies:

- The roof performs the function of a floor, such as for parking vehicles, or as a means of escape.
- The structure is essential for the stability of an external wall that needs to be fire resisting (e.g., to achieve compartmentation or for the purposes of preventing fire spread between buildings).

### 6.3 COMPARTMENTATION AND FIRE-RESISTING CONSTRUCTION

All the floors within Accommodation Building will be designed as compartment floors as per requirements of ADB Vol 2 for residential (other) buildings. No compartment floors are proposed within the Facilities Building.

The requirements for the provision of compartmentation and fire resisting construction, as well as associated fire doors, are shown in the Table 5.

**Table 5 – Compartmentation and Fire Resisting Construction**

Area	Fire Resistance Requirements	Exposure	Fire Doors
Compartment floors separating the residential areas from adjacent areas.	REI 60	From underside	-
Compartment walls separating the residential areas from adjacent areas.	REI 60	From each side	FD30S
Protected hallway in the Main Building first floor apartment.	REI 30	From each side	FD30
Protected stairs within Main Building.	REI 60	From each side	FD30S
Protected lobbies to Plant Room and Overnight Bedroom at Main Building first floor.	REI 30	From each side	FD30S
Bedroom corridors in Guest Residential buildings.	REI 30	From each side	FD30S
Lift shafts.	REI 30	From each side	FD30
Areas of special fire hazard.	REI 30	From each side	FD30

Area	Fire Resistance Requirements	Exposure	Fire Doors
Enclosure containing life safety equipment or secondary power supply to life safety equipment.	REI 120	From each side	FD120S
Substations.	REI 240	From each side	FD120

- Period of resistance for Loadbearing (R), Integrity (E), Insulation(I).
- (S) denotes the inclusion of smoke seals on the fire door(s).
- Fire door sets to consist of a complete door set as defined by BS 8214: 2016. This includes door leaves, frames, cold smoke seals and closers where applicable.
- Areas of special fire hazard include oil-filled transformer rooms, switchgear rooms, boiler rooms, storage spaces for fuel or other highly flammable substances, rooms housing fixed internal combustion engines.

#### 6.4 USE OF TIMBER AND CLT CONSTRUCTION ELEMENTS

The guidance does not restrict the materials used for construction of the structural elements, provided they are designed to achieve the structural fire resistance required for the specific building.

Therefore, structural design of the buildings could incorporate timber or CLT elements if they are designed to achieve the required structural fire resistance for the individual buildings.

Where used as part of roof covering systems, build ups incorporating these materials will need to be shown to achieve the required fire performance in relation to the roof coverings, as discussed in Section 7.3.

#### 6.5 FIRE STOPPING AND PENETRATIONS THROUGH FIRE-RESISTING CONSTRUCTION

Fire-stopping would be provided at the junction of fire-separating walls and external walls in order to maintain the fire resistance period of fire-separating walls, and thereby prevent a fire from travelling around the junction and into the neighbouring space.

Penetrations through lines of fire-resisting separation should be fire-stopped to achieve the same fire resistance as the separating elements.

Fire collars are required where any kitchen / bathroom duct vents pass through external structural framing system (SFS).

All pipes, ductwork and services passing through fire-resisting separations should either be enclosed in fire-resisting construction (i.e., shafts) of matching fire resistance or provided with fire dampers of matching fire resistance. Certain small diameter pipes require only fire-stopping around the pipe, dependent on pipe material and the type of fire-resisting barrier penetrated. Further information is available in Table 10.1 of ADB Vol 2.

Pipes that pass through a fire separating element should meet one of the following provisions:

##### Proprietary Seals

Provided a proprietary sealing system which has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier.

##### Restricted Pipe Diameter

Where a proprietary sealing system is not used, fire stopping may be used around the pipe, keeping the opening as small as possible.

#### Sleeving

A pipe of lead, aluminium, aluminium alloy, fibre-cement or UPVC, with a maximum nominal internal diameter of 160mm, may be used with a sleeving of non-combustible pipe. The opening in the structure should be as small as possible and provide fire stopping between the pipe and structure. The sleeve should extend no less than 1000mm on either side of the structure.

#### 6.6 PROTECTION OF VENTILATION DUCTS AND FLUES

One of the following methodologies is to be implemented where a ventilation duct passes through a fire resisting element to maintain the integrity of the element being breached:

- Protection using fire and smoke dampers. It should be noted that fire dampers only are not suitable to protect escape routes, with actuated fire and smoke dampers required in these locations. They are also not suitable for ductwork serving kitchen extracts.
- Protection using fire-resisting enclosure achieving the fire resistance rating equivalent to the highest rated compartmentation it penetrates.

If dampers are chosen for stopping flame spread through the ductwork the type of damper required would be a fire damper. Fire dampers should be tested to BS EN 1366 Part 2: 1999 and be classified to BS EN 13501 Part 3: 2005. They should have an E classification equal to or greater than the element being penetrated and at least E 60.

Any air transfer grilles required as part of the ventilation system should not be provided within any wall, door, floor or ceiling enclosing a protected stairway or protected lobby.

Air transfer grilles located in any fire hazard rooms should be provided with both fire and smoke containment.

Any transfer grilles fitted in fire doors would need to be accompanied by a test certificate provided by the door manufacturer.

#### 6.7 CONCEALED SPACES

Cavity barriers would require to be provided to prevent the rapid spread of unseen fire or smoke in voids, and to prevent the spread of fire around compartmentation via voids and concealed spaces.

Concealed cavities (e.g., voids in partition walls, roof voids, voids between suspended ceilings and the soffit of the floor above) would be provided with cavity barriers to sub-divide them as outlined within ADB Vol 1 and 2.

In general, cavity barriers should be at 20m centres in cavities with exclusively Class C-s3, d2 or better materials. For other materials, the spacing between cavity barriers should be reduced to 10m.

Cavity barriers should achieve 30 minutes integrity fire resistance and 15 minutes insulation fire resistance.

Cavity barriers should be within the external wall cavity, positioned to align with the internal fire-resisting walls and floors, unless constructed in line with Diagram 9.2 of ADB Vol 2, presented in Figure 12 for ease of reference. Cavity barriers should also be installed to seal around any openings (windows or doors) in the external wall.

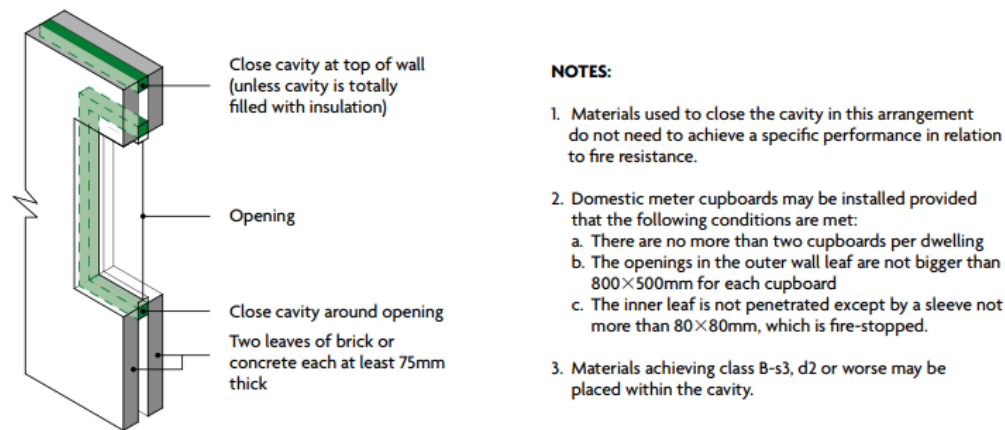


Figure 12 – Diagram 9.2 of ADB Vol 2

## 7 EXTERNAL FIRE SPREAD

### 7.1 BUILDING SEPARATION

The building design must ensure that fire spread does not occur from one building to another. Should a fire occur in a building, heat will radiate through non-fire resisting openings in the external walls.

In order to reduce the chance of this occurring, the Building Regulations place limits on the area of the external elevation with no fire resistance. This area is known as the unprotected area. The distance of the building from other buildings, the use of the building and the compartment size are all factors in determining the acceptable degree of unprotected area for each elevation.

External fire spread between adjoining building and site boundaries will be assessed using the Enclosing Rectangle Method detailed in BR 187 “External fire spread; building separation and boundary distances” published by the Building Research Establishment. In the method, a rectangle is drawn around the unprotected area which forms the façade of the compartment assessed; this area is called the “Enclosing Rectangle”. A table then gives the minimum boundary distance for the size of the enclosing rectangle and the proportion of unprotected area associated.

The external fire spread calculations have been carried out using the enclosing rectangle and based on the following assumptions:

- The residential areas within the Main Building are compartmented from the rest of the building. However, the entirety of the elevation will be considered for all the buildings due to the enclosing rectangle calculation method used by BR187.
- The radiation intensity at each unprotected area for the buildings is assumed to be 84kW/m<sup>2</sup> as per guidance from BR187.
- The enclosing rectangle will be considered as the height and width of the compartment area rather than only around the unprotected area (i.e., windows). This is an onerous assumption as it assumes that the walls will not provide any fire resistance.

The summary of the external fire spread assessment is presented in Table 6.

Table 6 – External Fire Spread Assessment

Building	Width, m	Height, m	Distance to Boundary, m	Maximum Unprotected Area
<b>Main Building</b>				
Northeast	38.95	11.31	26.03 <sup>1</sup>	100%
Southeast	34.85	11.31	1.92	0%
Southwest	50.64	8.20	6.3	40%
Northwest	34.85	8.20	38.83	100%
<b>Guest Residential West</b>				
Northwest	16.57	5.8	6.3	90%
East	25.17	5.8	2.76	30%
South	10.65	5.8	16.57	100%
West	25.17	5.8	60.32	100%
<b>Guest Residential South</b>				
Northeast	27.52	5.8	1.14	0%
Southeast	25.17	5.8	23.75	100%
Southwest	16.05	5.8	2.50	30%
<b>Guest Residential North</b>				
Northeast	25.18	5.8	42.30	100%
Southeast	16.53	5.8	47.63	100%
Southwest	25.18	5.8	1.14	0%
Northwest	16.53	5.8	1.92	20%
<b>Camping Changing</b>				
North	13.04	5.2	16.57	100%
East	20.48	5.2	4.52	50%
South	13.04	5.2	42.15	100%
West	20.48	5.2	43.42	100%

Note <sup>1</sup>: This elevation faces waterway, so the boundary line can be taken to the middle of the waterway.

External walls that are provided with the required fire resistance will be classed as protected area. Otherwise, that area will be counted as unprotected. The fire rating of the protected section of the external elevation that is more than 1m away from the notional boundary should be RE 30, I 15 for Guest Residential and RE 60, I 15 for Main Building and Camping Changing.

A small, unprotected area on a wall close or on a boundary is allowed. The small, unprotected area is an opening not larger than 1000mm x 1000mm and located not closer than any other opening of similar size within 4m vertically or horizontally, or an opening of 310mm x 310mm located not closer than 1.5m vertically and horizontally.

Walls achieving the required fire resistance but covered in a combustible material more than 1mm thick will be classed as having an unprotected area equal to 50% of their actual area.

### 7.2 EXTERNAL WALL CONSTRUCTION

All buildings have top floor height of less than 18m and only Main Building contains a single dwelling. Therefore, they will not be subject to the requirements of Regulation 7(2) for “relevant buildings”.

The summary of the external wall surface spread of flame performance requirements for both buildings is presented in Table 7.

**Table 7 – External Wall Surface Spread of Flame Performance Requirements**

Building	External Wall Surface Performance
Main Building.	Class C-s3,d2 or better <sup>1</sup>
Guest Residential.	No provisions
Camping Changing.	Class C-s3,d2 or better <sup>1</sup>

Note <sup>1</sup>: Timber cladding at least 9mm thick is also acceptable.

### 7.3 ROOF COVERING

The relevant test and classifications for the external fire performance of roof systems are BS 476-3 and BS EN 13501-5.

Roof coverings refer to a construction that can consist of one or more layers of materials but does not refer to the roof structure.

The roof covering fire performance requirements are as per Table 8 below.

**Table 8 – Roof Covering Fire Requirements**

Designation of Covering of Roof or Part of Roof	Distance from any Point of Relevant Boundary			
	Less Than 6m	At Least 6m	At Least 12m	At Least 20m
B <sub>ROOF</sub> (t4)	Acceptable	Acceptable	Acceptable	Acceptable
C <sub>ROOF</sub> (t4)	Not Acceptable	Acceptable	Acceptable	Acceptable
D <sub>ROOF</sub> (t4)	Not Acceptable	Not Acceptable	Not Acceptable	Acceptable
E <sub>ROOF</sub> (t4)	Not Acceptable	Not Acceptable	Not Acceptable	Not Acceptable
F <sub>ROOF</sub> (t4)	Not Acceptable	Not Acceptable	Not Acceptable	Not Acceptable

### 7.4 ROOF PV PANELS

It is proposed to provide PV panels integrated into the roof build up, with panels effectively becoming roof coverings, as part of the project design.

While the provision of PV panels would represent higher risk of fire than standard roof covering, as the panel itself would represent potential fire ignition risk, this would be comparable to the standard PV panels attached to the roof. Additionally, majority of the buildings on site, except for the Main Building, are low-occupancy single floor buildings with simple evacuation routes and simultaneous evacuation.

The standard PV panel considerations, such as provision of isolation switches for fire service use etc, should be incorporated.

Therefore, the proposals are considered reasonable. However, this should be discussed and agreed with Building Control and London Fire Brigade.

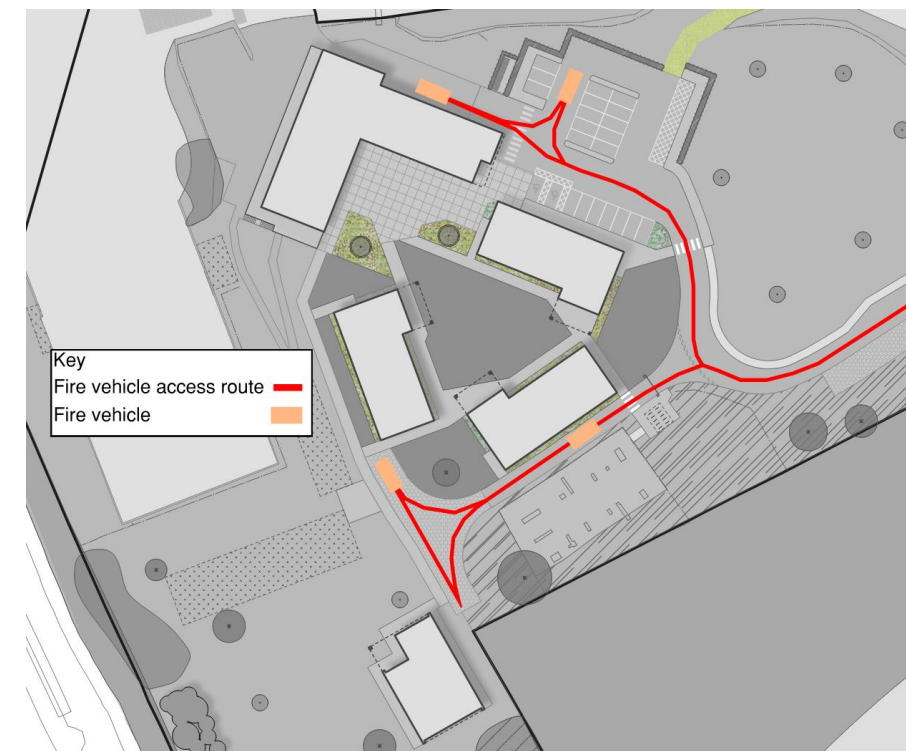
## 8 ACCESS AND FACILITIES FOR FIRE AND RESCUE SERVICE

### 8.1 VEHICLE ACCESS TO AND AROUND THE BUILDING

The firefighting access to the buildings will need to be provided as per one of the following, whichever is less onerous:

- 15% of the building perimeter.
- Within 45m of every point of the footprint of the building.

The fire vehicle access is provided to the buildings are shown in Figure 13. This will enable achieving the requirements for the access stated above.



**Figure 13 – Fire Vehicle Access Route**

The access routes for the pump fire vehicle should be in line with the recommendations in Table 9.

Table 9 – Fire Vehicle Access Route Design

Min Width of Road Between Kerbs	Min Width of Gateways	Min Turning Circle Between Kerbs	Min Turning Circle Between Walls	Min Clearance Height	Min Carrying Capacity
3.7m	3.1m	16.8m	19.2m	3.7m	14 tonnes <sup>1</sup>

Note <sup>1</sup>: This has been increased from 12.5 tonnes to reflect LPPA Guidance Note, GN 29, which notes the minimum carrying capacities for London Fire Brigade appliances.

## 8.2 PROVISION OF HYDRANTS

Hydrants should be located within 90m of an entry point to the building and no more than 90m apart. The existing hydrant provisions should be confirmed by the design team.

## 9 SECONDARY POWER SUPPLIES

All life safety systems will be provided with secondary power supplies in accordance with BS 8519:2020.

All plant that supports life safety fire equipment is to be enclosed within a minimum of REI 120 fire-resisting construction.

There must be minimal delay in changeover if the main power fails and it must occur automatically.

The emergency lighting / internally illuminated signage and fire alarm system will utilise internal batteries to provide back-up power. These batteries will be capable of a continuous stand-by supply in accordance with the relevant design standard and be fully rechargeable within a period of 24 hours.

## 10 FIRE SAFETY MANAGEMENT

### 10.1 REGULATORY REFORM (FIRE SAFETY) ORDER 2005

Management procedures have a pivotal role to play in fire prevention, control and evacuation of occupants should a fire incident occur. Within non-domestic premises, the Regulatory Reform (Fire Safety) Order 2005 (FSO) places legal obligations to do this on management of the building.

The 'responsible person' has a duty to make the premises safe and must undertake regular fire risk assessments. It is the responsible person who will be held accountable under the new legislation for any breaches in fire safety.

The owner or person in control of the premises is described as the *responsible person*.

### 10.2 MANAGEMENT AND RESPONSIBILITIES IN SUPPORT OF THE FIRE STRATEGY

To be able to demonstrate in broad terms that all structures, systems and components should be designed, constructed, commissioned, operated and maintained in such a way as to enable duty holders of the building to manage the risk and provision of fire service access and water supply, a Fire Statement document sets out to achieve the following principles:

- 1) Demonstrate that the building conforms to relevant building regulations and planning legislation and applies proportionate good engineering practice and sound risk management principles.
- 2) Identify the failure modes and potential hazards with respect to fire service access and water supply.
- 3) Provide sufficient information (golden thread) that demonstrates that any measures have been applied in an appropriate manner and at the first Gateway.

Inherent in fire strategy is the assumption that there will be appropriate fire safety management of the premises when in use. In accordance with BS 9999:2017, there are two management system levels, enhanced and adequate. Enhanced demonstrates a high level of assurance with a PAS 7 standard of management level. Adequate level of management demonstrates assurance which conforms with the requirements of legislation.

Management of fire safety must be integrated with all other management systems. To ensure there is no doubt as to where the responsibility for fire safety rests, and to enable consistency of approach, it is important that each establishment appoints a designated fire safety representative who reports to the nominated Building Safety Manager.

The appointed person should have the necessary authority and powers of sanction to ensure that standards of fire safety are maintained. The main duties of the Fire Safety Manager are as listed in BS 9999, include:

- 1) Managing the building to minimise the incidence of fire (fire prevention), e.g., good fire safe housekeeping and security.
- 2) Producing an Emergency Fire Plan.
- 3) Being aware of all of the fire safety features provided and their purpose.
- 4) Being aware of any particular fire risks on the premises, plus those relating to construction materials.
- 5) Being aware of their responsibilities towards occupants who may require assistance during any evacuation.
- 6) Liaising with, and where necessary seek the advice of, the fire authority, the licensing authority and other relevant enforcing authorities.
- 7) Having powers to deal with individuals who damage or tamper with fire safety systems, who ignore any smoking policy or who block exits.
- 8) Liaising with other fire safety managers in a multi-occupancy arrangement.
- 9) Ensuring that public areas are suitably controlled.
- 10) Ensuring that tenants, concessionaires or caretakers are appropriately briefed as to the fire procedures for the building.
- 11) Ensuring that all necessary and appropriate communication systems are in place to deal with any fire incident.
- 12) Checking the adequacy of any fire-fighting equipment and ensuring its regular maintenance.
- 13) Ensuring fire escape routes and fire exit doors / passageways are kept unobstructed and doors operate correctly.
- 14) Ensuring that fire detection and protection systems are maintained and tested, and proper records are kept; and
- 15) Ensuring any close down procedures are followed.

Good fire safe housekeeping will be encouraged to ensure that the effectiveness of the fire safety provisions is not adversely affected. This should include adequate provision for the disposal of waste and / or rubbish.



Where appropriate, these facilities should be emptied on a daily basis and the rubbish stored in a suitable area outside the building. Maintenance procedures should be developed to ensure that all equipment and services are able to operate effectively. Maintenance staff should be trained in the importance of the fire safety systems and planned maintenance programmes developed.

The management of ancillary accommodation will need to develop procedures to assist with the evacuation of vulnerable persons and should not rely on the fire and rescue service for assistance.

Suitable assembly points outside the building should be identified. These should be remote from the access routes used by the attending Fire Services.

Maintenance procedures will be developed to ensure that all equipment and services are able to operate effectively. Maintenance staff will be trained in the importance of the fire safety systems and planned maintenance programmes developed.

Where installed, fire points for fire extinguishers should be located at storey exits to ensure that coverage of at least one fire point containing a Water type and Carbon Dioxide type fire extinguisher for every 200m<sup>2</sup> of floor area. The type and size of fire extinguisher(s) at each fire point should be selected in accordance with BS 5306 guidance.

## 11 DRAWING SCHEDULE

Table 10 – Drawings Received

Drawing No.	Drawing Title	Rev.
PR-200-PEV-XX-B1-DR-A-11211	Proposed GA Plan – B1, General Arrangement Plan, B1 – Main Building	P08
PR-200-PEV-XX-00-DR-A-11212	Proposed GA Plan – 00, General Arrangement Plan, B1 – Main Building	P08
PR-200-PEV-XX-01-DR-A-11212	Proposed GA Plan – 01, General Arrangement Plan, B1 – Main Building	P07
PR-200-PEV-XX-ZZ-DR-A-11411	Proposed Sections, B1 – Main Building	P05
PR-200-PEV-XX-ZZ-DR-A-13111	Proposed Elevations, B1 – Main Building	P06
PR-200-PEV-ZZ-00-DR-A-21201	Proposed GA Plan – 00, General Arrangement Plan, B2 – Guest Residential	P05
PR-200-PEV-ZZ-R1-DR-A-21202	Proposed GA Plan – R1, General Arrangement Plan, B2 – Guest Residential	P04
PR-200-PEV-ZZ-ZZ-DR-A-24101	Proposed Sections, B2 – Guest Residential	P04
PR-200-PEV-ZZ-ZZ-DR-A-23101	Proposed Elevations, North and South Elevations, B2 – Guest Residential	P06
PR-200-PEV-ZZ-ZZ-DR-A-23102	Proposed Elevations, East and West Elevations, B2 – Guest Residential	P05
PR-200-PEV-ZZ-00-DR-A-31241	Proposed GA Plan – 00, General Arrangement Plan, B3 – Camping Changing	P06
PR-200-PEV-ZZ-R1-DR-A-31241	Proposed GA Plan – R1, General Arrangement Plan, B3 – Camping Changing	P06
PR-200-PEV-ZZ-ZZ-DR-A-34141	Proposed Sections, B3 – Camping Changing	P04
PR-200-PEV-ZZ-ZZ-DR-A-33141	Proposed Elevations, B3 – Camping Changing	P05
PR-200-PEV-XX-ZZ-DR-A-00103	Proposed Site Block Plan	P03